Simulating MODIS with MAS

PURPOSE:

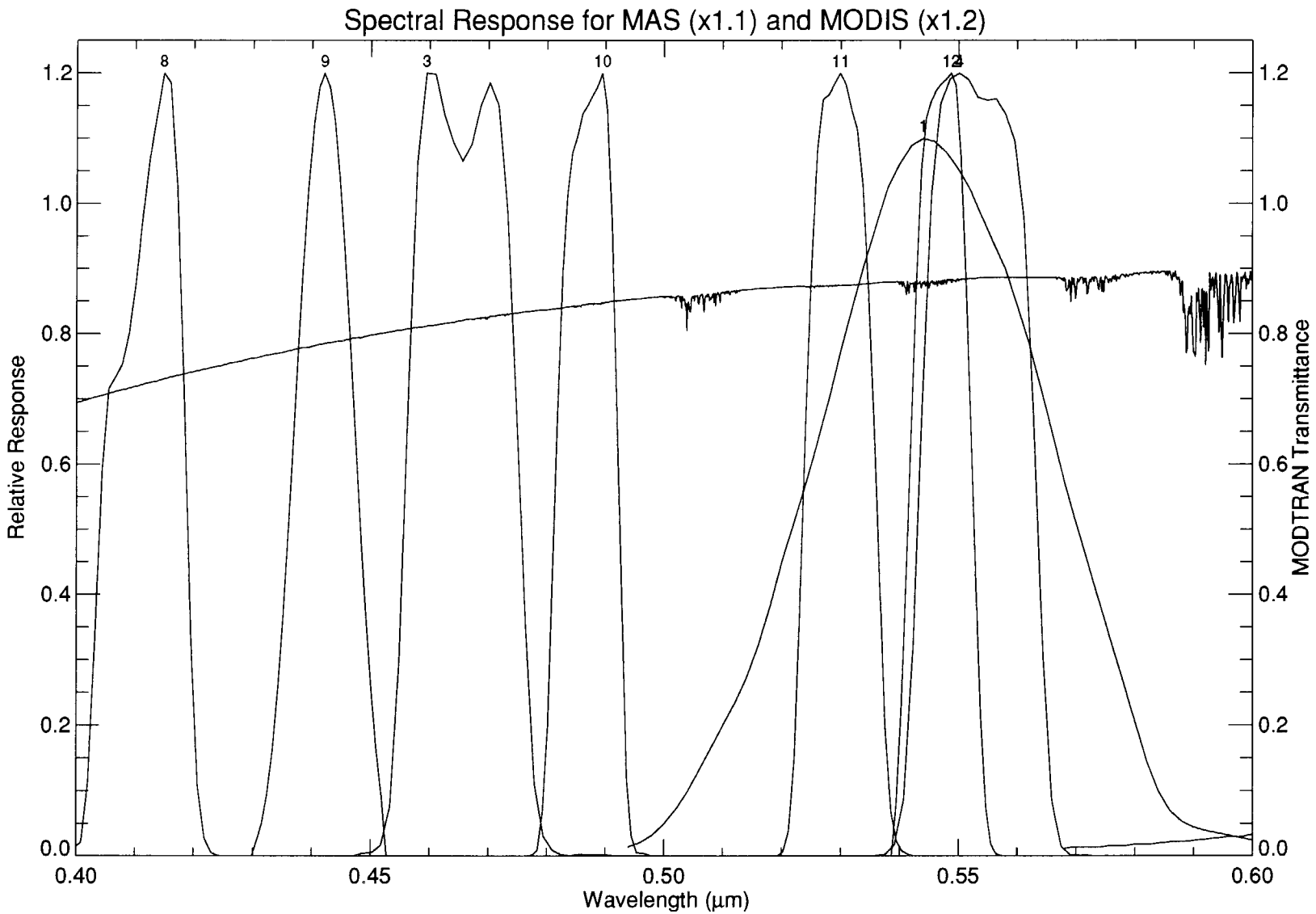
- UW MODIS Product algorithm development
- Available to other users in MODIS community

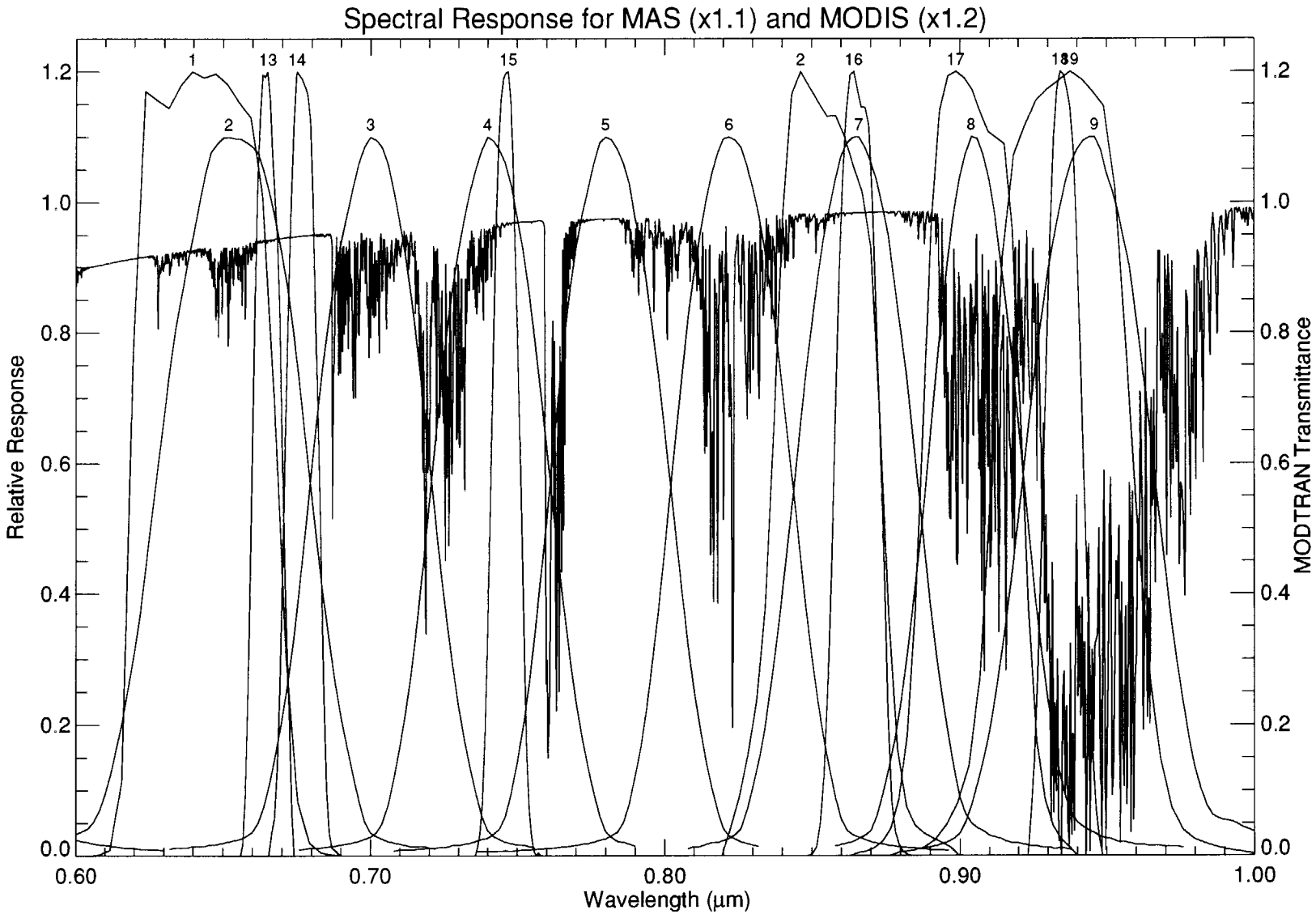
GOALS:

- Match MODIS spectral bands with best possible MAS spectral match
- Use real data where possible, forward model data only where absolutely necessary
- Approximate co-registration of MODIS
- Best possible radiometric calibration (Wisconsin IR, GSFC VIS)
- Output data (Level-1B and geolocation) in HDF3.3r4 SDS format

MAS and MODIS Spectral Band Equivalence

MAS	MODIS	λ_{MODIS}	Comments
2	1	0.64	OK match, MAS longer λ, small absorption
7	2	0.86	OK match, MAS longer λ, MODIS more absorption
1	3	0.47	No MAS equivalent, use MAS λ 0.55, minimal absorption in both
1	4	0.56	Good match, MAS shorter λ, minimal absorption
10	5	1.24	No MAS equivalent, use MAS λ 1.65, small absorption in both
10	6	1.64	OK match, MAS shorter λ, small absorption
21	7	2.13	OK match, MAS longer λ, MODIS broader, absorption in both
1	8	0.41	No MAS equivalent, use MAS λ 0.55, minimal absorption in both
1	9	0.44	No MAS equivalent, use MAS λ 0.55, minimal absorption in both
1	10	0.48	No MAS equivalent, use MAS λ 0.55, minimal absorption in both
1	11	0.53	OK match, MAS broader, MAS longer λ, minimal absorption
1	12	0.55	Good match, MAS shorter λ, minimal absorption
2	13	0.66	OK match, MAS broader and shorter λ, MAS more absorption
2	14	0.67	OK match, MAS broader and shorter λ, MAS more absorption
4	15	0.74	OK match, MAS broader and shorter λ, MAS more absorption
7	16	0.86	Good match, MAS broader, MAS more absorption
8	17	0.90	Good match, significant absorption in both
9	18	0.93	OK match, MAS broader, significant absorption in both
9	19	0.94	OK match, MODIS broader, significant absorption in both
31	20	3.75	Good Match
32	21,22	3.95	MAS shifted to shorter wavelengths; no spectral features
33	23	4.05	More absorption in MAS 33 than in MODIS 23
36	24	4.46	More CO2 absorp in MODIS 24 than MAS 36
36	25	4.51	Good Match, MAS has twice the bandwidth
15	26	1.38	No MAS equivalent, use MAS λ 1.88
–	27	6.7	No MAS counterpart - simulated using MODIS fast model
–	28	7.3	No MAS counterpart - simulated using MODIS fast model
42	29	8.55	Good Match
–	30	9.73	No MAS equivalent, simulated using MODIS fast model
45	31	11.0	Good Match
46	32	12.0	Good Match
48	33	13.3	OK match, MODIS more absorption
49	34	13.6	OK match, MAS more absorption
49,50	35	13.9	Average of MAS bands 49 and 50
50	36	14.2	OK match


Spectral Response for MAS (x1.1) and MODIS (x1.2)
8
9
3
10
11
12
1
Relative Response
MODTRAN Transmittance
Wavelength (μm)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0.40
0.45
0.50
0.55
0.60


Spectral Response for MAS (x1.1) and MODIS (x1.2)
Relative Response
MODTRAN Transmittance
Wavelength (μm)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0.60
0.70
0.80
0.90
1.00
1
13
14
15
2
16
17
18
19
2
3
4
5
6
7
8
9

Simulating MODIS with MAS

Data Set Production:
Calendar 1996

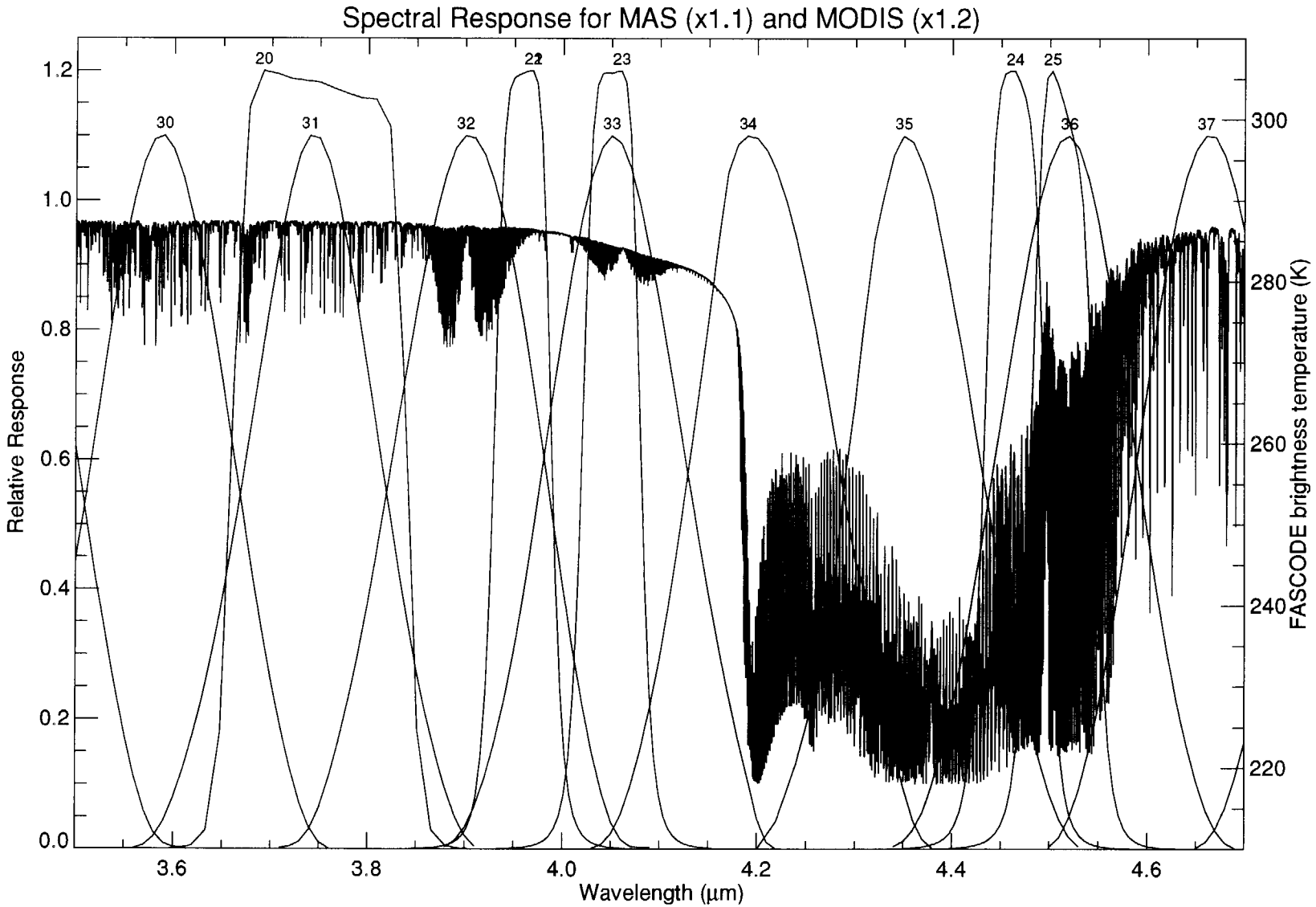
1st Q: Clear sky over water

2nd Q: Clouds over water

3rd Q: Clear scene, limb corrected IR
True MODIS spatial resolution

4th Q: ?

Data sets produced for UW purposes on an "as needed" basis.


Spectral Response for MAS (x1.1) and MODIS (x1.2)
Relative Response
FASCODE brightness temperature (K)
Wavelength (μm)
20
22
23
24
25
30
31
32
33
34
35
36
37
1.2
1.0
0.8
0.6
0.4
0.2
0.0
300
280
260
240
220
3.6
3.8
4.0
4.2
4.4
4.6

Simulating MODIS with MAS

Data Set Production:
Calendar 1996

1st Q: Clear sky over water

2nd Q: Clouds over water

3rd Q: Clear scene, limb corrected IR
True MODIS spatial resolution

4th Q: ?

Data sets produced for UW purposes on an "as needed" basis.